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EXAMINER

VAN, LUAN V

ART UNIT PAPER NUMBER

1753

DATE MAILED: 03/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/772,683

Applicant(s)

WARE ET AL.

Examiner

Luan V. Van

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/26/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13,15-19,23-28,31-38 and 40-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13,15-19,23-28,31-38 and 40-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

Applicant's amendment of January 26, 2006 does not render the application allowable.

The amendment is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Claims 13, 15-19 and 23-27 are amended to recite the limitation of "alkali chloride"; and claims 32 and 43 recite a temperature range of "100 to 160°F". However, there is no evidence in the applicant's disclosure to support these limitations. With respect to the former claims, the disclosure teaches sodium chloride but does not teach other alkali chlorides. Since alkali chlorides encompasses other alkali metals besides sodium, the limitation of alkali is broader than what is supported by the applicant's disclosure. With respect to the latter claims, the applicant's disclosure only supports a temperature range from 110 to 170°F (page 10); the amended temperature range is outside of this range. The disclosure, therefore, does not provide a clear indication to support the amended limitations. Applicant is required to cancel the new matter in the reply to this Office Action.

Status of Objections and Rejections

Art Unit: 1753

The objection to the claims has been withdrawn in view of Applicant's amendment.

The rejection of claims 14, 20-22, 29-30 and 39 is obviated by Applicant's cancellation.

The rejection of claims 28, 31 and 35 under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Beebe, Jr. et al. and Sturgill et al. is maintained.

The rejection of claims 32 under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Beebe, Jr. et al. and Sturgill et al., and further in view of Du Rose is maintained.

The rejection of claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Beebe, Jr. et al. and Sturgill et al., and further in view of Kedward et al. is maintained.

All other rejections from the previous office action are withdrawn in view of applicant's amendments.

New rejections under 35 U.S.C. 103(a) are necessitated by the amendments.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 13, 15-19, 23-27, 32 and 43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 13, 15-19 and 23-27 are amended to recite the limitation of "alkali chloride"; and claims 32 and 43 recite a temperature range of "100 to 160°F". However, there is no evidence in the applicant's disclosure to support these limitations. With respect to the former claims, the disclosure teaches sodium chloride but does not teach other alkali chlorides. Since alkali chlorides encompasses other alkali metals besides sodium, the limitation of alkali is broader than what is supported by the applicant's disclosure. With respect to the latter claims, the applicant's disclosure only supports a temperature range from 110 to 170°F (page 10); the amended temperature range is outside of this range. The disclosure, therefore, does not provide a clear indication to support the amended limitations.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

Art Unit: 1753

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 13, 15, 16, 19, 23, 24-28, 31 and 35 rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Beebe, Jr. et al. and Sturgill et al.

Regarding claims 13, 23 and 24, Brenner et al. teach a plating bath, comprising: a cobalt-phosphorous plating solution having a pH value in the range of 0.5-2.0 (column 2 lines 30-35); cobalt metal ions (figure 9) contained within said plating solution, chloride ions (figure 9) contained within said plating solution, phosphorous ions (figure 9) contained within said plating solution, an oxidizing agent (or boric acid, column 3 lines 21-25) contained within said plating solution, and a hardening agent (or phosphorous acid, figure 9) contained within said plating solution. The elements are present in the solution as ions, since they are soluble.

The difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach a solution comprising of copper sulfate and sodium chloride nor their concentration; perborate as the source of boron nor its concentration; nor the specific concentration of phosphorous acid of the instant claim.

Beebe, Jr. et al. teach method of plating a cobalt-phosphorous layer with the characteristics of "long fatigue life and high load carrying capacity in addition to ... good corrosion resistance" (column 1 lines 23-28) for the fabrication of bearings and the like. In addition, Beebe, Jr. et al. teach that a typical cobalt-phosphorus plating solution comprises copper sulfate, sodium chloride (with a concentration of 17 g/L or about 2.3 oz/gal, which is within the range of the instant claim) and boric acids; and that a similar plating of cobalt- phosphorous can be suitably achieved by employing a solution comprising of cobalt chloride and sodium hypophosphite (column 4 lines 16-45).

Sturgill et al. teach using perborate (paragraph 53) as suitable oxidizers, and that "Oxidizers serve two important functions within the coating: 1) they act in cooperation with the stabilizer to impede the flow of ionic species through the coating, therefore minimizing charge transport, and 2) if a scratch is formed in the coating, these oxidizing species act to repair the breach by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier. The effectiveness of the oxidizing species is a function of its individual oxidation-reduction potential; with more highly oxidized species exhibiting greater corrosion protection" (paragraph 51).

Addressing claim 13, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al.

by using the copper sulfate and sodium chloride of Beebe, Jr. et al., because copper sulfate and sodium chloride are suitable for plating cobalt-phosphorous alloys having high tensile strength and good corrosion resistance properties. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the solution of Brenner et al. by using the perborate of Sturgill et al., because it would repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier (paragraph 51). With respect to the concentration of cobalt sulfate, perborate, and phosphoric acid, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the concentrations to within the ranges of the instant claim by routine experimentation in order to form a cobalt-phosphorous alloys having the desired tensile strength and corrosion resistance properties. Furthermore, changes in concentration will not support the patentability of subject matter unless there is evidence indicating such concentration is critical. It is not inventive to discover the optimal or workable ranges by routine experimentation (MPEP 2144.05).

Addressing claim 19, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al. by using the copper sulfate and sodium chloride of Beebe, Jr. et al., because copper sulfate and sodium chloride are suitable for plating cobalt-phosphorous alloys having high tensile strength and good corrosion resistance properties.

Regarding claim 25, the difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach using sodium phosphite

Art Unit: 1753

or hypophosphite, although Brenner et al. teach that phosphites are the most satisfactory source of phosphorous (column 2 lines 23-29). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al. by using a solution comprising of sodium phosphite or hypophosphite as taught by Beebe, Jr. et al., because sodium phosphite or hypophosphite are suitable sources of phosphorous and are suitable for forming cobalt-phosphorous alloys.

Regarding claim 15, Brenner et al. teach the cobalt metal content of said plating solution is about 39 g/L (computed from the 180 g/L of cobalt chloride in figure 9), or about 5.2 oz/gal, which is within the range of the instant claim.

Regarding claim 16, Brenner et al. teach a phosphorous-cobalt alloy plating solution comprising of cobalt chloride as a cobalt salt.

Regarding claims 26 and 27, Brenner et al. teach a phosphorous-cobalt alloy plating solution comprising of phosphoric acid (figure 9).

Regarding claim 28, Brenner et al. teach a plating bath, comprising: cobalt chloride (figure 9) contained within said plating solution having a pH value in the range of 0.5-2.0 (column 2 lines 30-35), boric acid (column 3 lines 21-25) contained within said plating solution, phosphoric acid, and phosphorous acid having a concentration of up to 160 g/L or about 21.3 oz/gal (figure 4) contained within said plating solution.

The difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach a solution comprising of copper sulfate and

Art Unit: 1753

sodium chloride nor their concentration; perborate as the source of boron nor its concentration; nor the specific concentration of phosphorous acid of the instant claim.

Beebe, Jr. et al. teach method of plating a cobalt-phosphorous layer with the characteristics of "long fatigue life and high load carrying capacity in addition to ... good corrosion resistance" (column 1 lines 23-28) for the fabrication of bearings and the like. In addition, Beebe, Jr. et al. teach that a typical cobalt-phosphorus plating solution comprises copper sulfate, sodium chloride (with a concentration of 17 g/L or about 2.3 oz/gal, which is within the range of the instant claim) and boric acids; and that a similar plating of cobalt- phosphorous can be suitably achieved by employing a solution comprising of cobalt chloride and sodium hypophosphite (column 4 lines 16-45).

Sturgill et al. teach using perborate (paragraph 53) as suitable oxidizers, and that "Oxidizers serve two important functions within the coating: 1) they act in cooperation with the stabilizer to impede the flow of ionic species through the coating, therefore minimizing charge transport, and 2) if a scratch is formed in the coating, these oxidizing species act to repair the breach by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier. The effectiveness of the oxidizing species is a function of its individual oxidation-reduction potential, with more highly oxidized species exhibiting greater corrosion protection" (paragraph 51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al. by using the copper sulfate and sodium chloride of Beebe, Jr. et al., because copper sulfate and sodium chloride are suitable for plating cobalt-phosphorous alloys having high tensile strength

Art Unit: 1753

and good corrosion resistance properties. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the solution of Brenner et al. by using the perborate of Sturgill et al., because it would repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier (paragraph 51). With respect to the concentration of cobalt sulfate, perborate, and phosphoric acid, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the concentrations to within the ranges of the instant claim by routine experimentation in order to form a cobalt-phosphorous alloys having the desired tensile strength and corrosion resistance properties. Furthermore, changes in concentration will not support the patentability of subject matter unless there is evidence indicating such concentration is critical. It is not inventive to discover the optimal or workable ranges by routine experimentation (MPEP 2144.05).

Regarding claims 31, Brenner et al. does not explicitly teach the solution having the specific surface tension of the instant claim. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have recognized that the solution of Brenner et al. would have the specific surface tension of the instant claim, because the solution produces a cobalt-phosphorous coating having similar tensile strength and corrosion resistance properties.

Regarding claim 35, Brenner et al. teach using a current density of 5-30 A/dm², equivalent to 50-300 A/ft² (column 5 lines 35-39).

Claims 17-18 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Sturgill et al., Beebe, Jr. et al., and further in view of Kedward et al.

Brenner et al., Sturgill et al. and Beebe, Jr. et al. teach the solution as described above in addressing claim(s) 13.

The difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach using cobalt chips or cobalt balls as a source for the cobalt metal ions.

Kedward et al. teach using cobalt chips as a source for the cobalt metal ions in a cobalt plating solution (column 4 lines 22-33).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al., Sturgill et al. and Beebe, Jr. et al. by using cobalt chips or cobalt balls as a source for the cobalt metal ions as taught by Kedward et al., because cobalt chips or cobalt balls can be easily dissolved in a plating solution. Furthermore, since the instant claims are directed to a solution, the size and shape of the anode would not patentably distinguish the instant invention. The solution should be distinguished by its composition and not by the source of the constituents.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Beebe, Jr. et al. and Sturgill et al., and further in view of Du Rose.

Art Unit: 1753

Brenner et al., Beebe, Jr. et al., and Sturgill et al. teach the solution as described above in addressing claim(s) 28. The difference between the references and the instant claims is that the references do not explicitly teach the solution having the specific temperature of the instant claim, although Brenner et al. teach that increasing the bath temperature increases the cathode efficiency (figure 3) and "most of the plating was done that 75°C" (column 5 line 4).

Du Rose teach that the operating temperature of a typical bath, comprising of cobalt chloride or cobalt sulfate (column 6 lines 53-58), is in the range of about 130-150°F (column 8 lines 4-13). Du Rose further noted that this range of temperatures not critical, and that good deposits may be obtained at temperatures as low as 50°F or lower to as high as 180°F.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the combined solution of Brenner et al., Beebe, Jr. et al., and Sturgill et al. by operating within the temperature range of Du Rose, because such temperature range is suitable for depositing a corrosion resistant coating.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Beebe, Jr. et al. and Sturgill et al., and further in view of Lichtenberger et al.

Brenner et al., Beebe, Jr. et al., and Sturgill et al. teach the solution as described above in addressing claim(s) 28.

The difference between the references and the instant claims is that the references do not explicitly teach the solution using a platinized metal anode.

Lichtenberger et al. teach "It has been found that platinum and rhodium strips (e.g. wires) are more effective over time than other conventional anode materials, such as iridium, gold, palladium, rhenium, and ruthenium. Platinized titanium prevents the oxidation of phosphorous acid, but spalls and in time becomes unusable" (column 3 lines 10-15).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the combined solution of Brenner et al., Beebe, Jr. et al., and Sturgill et al. by using the platinum anode of Lichtenberger et al., because a platinum anode is more effective over time than other conventional anode materials.

Claim 36 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Brenner et al.

Brenner et al. teach an electroplating method comprising the steps of: submerging a substrate having a catalytically active surface into a cobalt-phosphorous plating solution having a pH value in the range of 0.5-2.0 (column 2 lines 30-35) and applying a current density of 5-30 A/dm², equivalent to 50-300 A/ft² (column 5 lines 35-39). It is well known in the art that any electroplating process inherently comprises the step of immersing a substrate in an electroplating bath containing an anode and a cathode (as the substrate), since metal is being plated in a solution. Electroplating by definition comprises the step of passing an electric current between the anode in the

Art Unit: 1753

cathode, since positive metal ions are attracted to the cathode where they combine with electrons, yielding neutral metal which is plated onto the electrode. Furthermore, Brenner et al. teach electroplating a cobalt -phosphorous coating in a solution containing the same constituents as those of the instant claim (i.e., cobalt ions, phosphorous ions and boron) and with the same composition in the coating (i.e., a cobalt-phosphorous coating having up to 10% phosphorus (column 4 lines 31-38)). Therefore, Brenner et al. anticipates the instant claim.

Although Brenner et al. does not explicitly teach the concentration a boron, a cobalt -phosphorous coating plated by a solution comprising of boric acid as a source of boron would inherently comprise boron in the coating, since the method of forming the coating as taught by Brenner et al. is the same as that of the instant claim. Even assuming that the presence of boron in the coating is a newly discovered property of the instant invention, the "mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention" (MPEP 2145).

Claim 37 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Sturgill et al.

Brenner et al. teach the method as described above. In addition, Brenner et al. teach baking a cobalt -phosphorous coating to increase its hardness (i.e., wear resistance). (Column 5 line 73 -- column 6 line 4). Brenner et al. differs from the instant claims in that the reference does not explicitly teach precleaning the surface.

Art Unit: 1753

Sturgill et al. teach a process for plating, comprising the steps of: providing a substrate having a surface, cleaning and preparing (paragraph 753-770) said surface during a pretreatment during a cobalt-phosphorous plating process, applying a cobalt-phosphorous-boron coating (paragraph 771) to said surface and finishing said surface during a post treatment process (paragraph 773-781).

Regarding claim 37, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Brenner et al. by pre-cleaning the surface as taught by Sturgill et al., because it would remove oil or greases on the part to be coated (paragraph 764).

Regarding claim 40, since a mask is used for protecting areas where the coating is not desired during the electroplating process, removing a mask would have been obvious to one having ordinary skill in the art when its function is no longer desirable,

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Sturgill et al., and further in view of Brar et al.

Brenner et al. and Sturgill et al. teach the method as described above.

Brenner et al. and Sturgill et al. differ from the instant claims in that the reference does not explicitly teach using dry abrasive blast.

Brar et al. teach using dry abrasive blast in order to increase the hardness of a bearing surface (column 3 lines 14-26) prior to forming a wear resistant coating thereon.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Brenner et al. and Sturgill et al. by

using dry abrasive blast as taught by Kedward et al., because it would increase the hardness of a metal surface, and because it would roughen a metal surface to improve the adhesion and uniformity of a plated metal coating on the surface.

Claims 41-42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Sturgill et al., Brar et al., and Beebe, Jr. et al.

Regarding claim 41, Brenner et al. teach a method, comprising the steps of: submerging a substrate having a catalytically active surface into a cobalt-phosphorous plating solution having a pH value in the range of 0.5-2.0 (column 2 lines 30-35); providing a plating solution comprising cobalt chloride (figure 9) contained within said plating solution, boric acid (column 3 lines 21-25) contained within said plating solution, phosphoric acid, and phosphorous acid having a concentration of up to 160 g/L or about 21.3 oz/gal (figure 4) which is within the range of the instant claim. Brenner et al. teach baking a cobalt -phosphorous coating to increase its hardness (i.e., wear resistance). (Column 5 line 73 -- column 6 line 4). Brenner et al. teach using a current density of 5-30 A/dm², equivalent to 50-300 A/ft² (column 5 lines 35-39). It is well known in the art that any electroplating process inherently comprises the step of immersing a substrate in an electroplating bath containing an anode and a cathode (as the substrate), since metal is being plated in a solution. Electroplating by definition comprises the step of passing an electric current between the anode in the cathode, since positive metal ions are attracted to the cathode where they combine with electrons, yielding neutral metal which is plated onto the electrode. Furthermore,

Art Unit: 1753

Brenner et al. teach electroplating a cobalt -phosphorous coating in a solution containing the same constituents as those of the instant claim (i.e., cobalt ions, phosphorous ions and boron) and with the same composition in the coating (i.e., a cobalt-phosphorous coating having up to 10% phosphorus (column 4 lines 31-38)).

Although Brenner et al. does not explicitly teach the concentration a boron, a cobalt - phosphorous coating plated by a solution comprising of boric acid as a source of boron would inherently comprise boron in the coating, since the method of forming the coating as taught by Brenner et al. is the same as that of the instant claim. Even assuming that the presence of boron in the coating is a newly discovered property of the instant invention, the "mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention" (MPEP 2145).

The difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach providing and pretreating an aircraft component; specifically using dry abrasive blast in the pretreatment; providing a solution comprising of copper sulfate and sodium chloride nor their concentration; perborate as the source of boron nor its concentration; the specific concentration of phosphorous acid of the instant claim; nor removing the mask.

Sturgill et al. teach a process for plating, comprising the steps of: providing a aircraft component substrate having a surface (paragraph 4), cleaning and preparing (paragraph 753-770) said surface during a pretreatment during a cobalt-phosphorous plating process, wherein said pretreatment comprises degreasing, masking, alkaline cleaning, acid activity (such as deoxidizing) (paragraph 753-770), applying a cobalt-

Art Unit: 1753

phosphorous-boron coating (paragraph 771) to said surface and finishing said surface during a post treatment process (paragraph 773-781). Sturgill et al. teach using perborate as suitable oxidizers, which function to repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier (paragraphs 51-53). In addition, Sturgill et al. teach that "oxidation of the cobalt to the trivalent state may also be achieved in the conversion coating solution through electrolytic means" (paragraph 54). Providing an anode and applying a current are inherent steps in an electroplating process. Although Sturgill et al. does not explicitly teach the step of removing the mask after a coating has been deposited, removing a mask would have been obvious to one having ordinary skill in the art when its function is no longer desirable, since a mask is used for protecting areas where the coating is not desired during the electroplating process.

Brar et al. teach using dry abrasive blast in order to increase the hardness of a bearing surface (column 3 lines 14-26) prior to forming a wear resistant coating thereon.

Beebe, Jr. et al. teach method of plating a cobalt-phosphorous layer with the characteristics of "long fatigue life and high load carrying capacity in addition to ... good corrosion resistance" (column 1 lines 23-28) for the fabrication of bearings and the like. In addition, Beebe, Jr. et al. teach that a typical cobalt-phosphorus plating solution comprises copper sulfate, sodium chloride (with a concentration of 17 g/L or about 2.3 oz/gal, which is within the range of the instant claim) and boric acids; and that a similar plating of cobalt- phosphorous can be suitably achieved by employing a solution comprising of cobalt chloride and sodium hypophosphite (column 4 lines 16-45).

Art Unit: 1753

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Brenner et al. by pretreating the surface of the substrate, because it would improve the adhesion and uniformity of a plated metal coating on the substrate. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the method of Brenner et al. by using the perborate of Sturgill et al., because it would repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the method of Brenner et al. by using dry abrasive blast as taught by Kedward et al., because it would increase the hardness of a metal surface, and because it would roughen a metal surface to improve the adhesion and uniformity of a plated metal coating on the surface.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the method of Brenner et al. by substituting cobalt chloride with copper sulfate and sodium chloride as taught by Beebe, Jr. et al., because copper sulfate and sodium chloride are suitable for plating cobalt-phosphorous alloys having high tensile strength and good corrosion resistance properties.

With respect to the concentrations of the chemical compounds, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the concentrations to within the ranges of the instant claim by routine experimentation in order to form a cobalt-phosphorous alloys having the desired tensile

Art Unit: 1753

strength and corrosion resistance properties. Furthermore, changes in concentration will not support the patentability of subject matter unless there is evidence indicating such concentration is critical. It is not inventive to discover the optimal or workable ranges by routine experimentation (MPEP 2144.05). With respect to providing the coating on an aircraft substrate, such limitation is an intended use of the instant invention and, thus, is not given patentability weight.

Regarding claim 42, a plating tank is inherently provided for holding the plating solution.

Regarding claim 44, although Brenner et al. does not explicitly teach the plating rate, Brenner et al. teach that increasing the bath temperature increases the cathode efficiency (figure 3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the rate of deposition by changing the parameters of the plating solution, such as temperature, current density and concentrations, through routine experimentation in order to form a cobalt-phosphorous alloys having the desired tensile strength and corrosion resistance properties.

Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Sturgill et al., Brar et al., Beebe, Jr. et al., and further in view of Du Rose.

Brenner et al., Sturgill et al., Brar et al., and Beebe, Jr. et al. teach the method as described above in addressing claim(s) 41. The difference between the references and the instant claims is that the references do not explicitly teach the solution having the

Art Unit: 1753

specific temperature of the instant claim, although Brenner et al. teach that increasing the bath temperature increases the cathode efficiency (figure 3).

Du Rose teach that the operating temperature of a typical bath, comprising of cobalt chloride or cobalt sulfate (column 6 lines 53-58), is in the range of about 130-150°F (column 8 lines 4-13). Du Rose further noted that this range of temperatures not critical, and that good deposits may be obtained at temperatures as low as 50°F or lower to as high as 180°F.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the combined method of Brenner et al., Sturgill et al., Brar et al., and Beebe, Jr. et al. by operating within the temperature range of Du Rose, because such temperature range is suitable for depositing a corrosion resistant coating.

Response to Arguments

Applicant's arguments filed , 2005 have been fully considered but they are not persuasive.

In the arguments presented on page 14-15 of the amendment, the applicant argues that Brenner et al. do not teach the pH of the instant invention. The examiner respectfully disagrees. Brenner et al. specifically teach "The best deposits were obtained from ordinary nickel or cobalt baths to which phosphoric, and phosphorus

acids had been added. The favorable pH of the baths was between 0.5 and 2.0 depending upon their compositions" (column 2 lines 29-34).

Regarding Sturgill et al., the applicant argues on page 18 that it would not have been obvious to combine the teachings of Sturgill et al. with the teachings of Brenner et al. to achieve the the plating solution and the plating process of the present invention, since Sturgill et al. uses a different coating process. The examiner acknowledges that the methods may be different. However, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As the Court of Appeals for the Federal Circuit has stated, there are three possible sources for motivation to combine references in a manner that would render claims obvious. These are: (1) the nature of the problem to be solved; (2) the teaching of the prior art; and (3) the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 47 U.S.P.Q.2d 1,453, 1,458 (Fed. Cir. 1998). In the instant case, both Brenner et al. and Sturgill et al. are directed to plating a cobalt-phosphorous coating for corrosion protection. Furthermore, Brenner et al. teach "The phosphorus-cobalt and -nickel deposits should be useful wherever hardness is required and might be considered as an alternative to chromium deposits" (column 8 lines 63-67); likewise, Sturgill et al. teach "Significant efforts have been made to replace chromium with other metals for corrosion-inhibiting applications

Art Unit: 1753

due to toxicity, environmental, and regulatory concerns. Cobalt is one non-toxic, non-regulated metal which has been considered as a chromium replacement" (paragraph 15).

In response to the argument that the perborate of Sturgill et al. is used for a different purpose than that of the instant invention or of Brenner et al., "the reason or motivation to modify the reference may often suggest what the inventor has done, but for different purpose for to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant" (MPEP 2144) and "there is no requirement that the prior art provide the same reason as the applicant to make the claimed invention" (MPEP 2144). Furthermore, Sturgill et al. explicitly teach using perborate (paragraph 53) as suitable oxidizers, and that "Oxidizers serve two important functions within the coating: 1) they act in cooperation with the stabilizer to impede the flow of ionic species through the coating, therefore minimizing charge transport, and 2) if a scratch is formed in the coating, these oxidizing species act to repair the breach by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier. The effectiveness of the oxidizing species is a function of its individual oxidation-reduction potential, with more highly oxidized species exhibiting greater corrosion protection" (paragraph 51). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the solution of Brenner et al. by using the perborate of Sturgill et al., because it would repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier (paragraph 51).

In response to applicant's arguments against the secondary references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The applicant argues against the secondary references by pointing out the deficiencies in the secondary references that are already taught by the primary reference. The examiner agrees that the secondary references do not anticipate the instant claims, therefore rejections under 35 U.S.C. 103(a) are appropriate.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1753

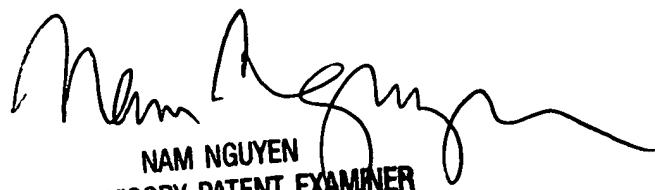
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan V. Van whose telephone number is 571-272-8521. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LVV
2/28/2006


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